

## Conformal Ablative TPS (CA-TPS)

Completed Technology Project (2013 - 2017)



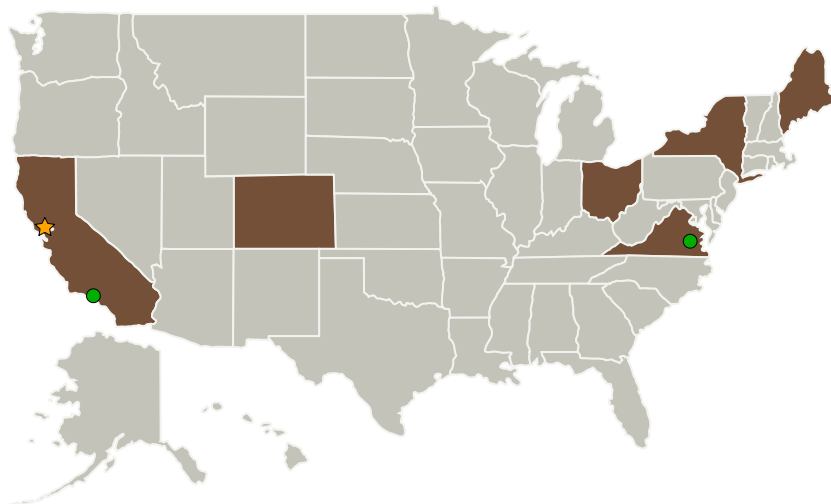
## Project Introduction

CA-TPS is enabling small businesses and universities with low cost access to space by using off-the-shelf broad goods and transferring the processing technology for a light weight TPS. Use of CA-TPS materials will allow future missions to Mars, Venus and Outer Planets to save both mass and cost.

## Anticipated Benefits

NASA funded: CA-TPS provides a lower cost, mass efficient solution that is easier to integrate due to the compliant and conformal nature of the material. CA-TPS can be used as a heat shield TPS for missions that will encounter peak heat flux  $\sim 500$  W/cm<sup>2</sup>, peak pressures around 0.4 atm, and shear up to 500 Pa. Conformal ablator makes integration much easier for the back shell where geometric complexities such as penetrations and protrusions often requires expensive integration procedures.

## Primary U.S. Work Locations and Key Partners



Conformal Ablative TPS

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## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

Ames Research Center (ARC)

**Responsible Program:**

Game Changing Development

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Organizations Performing Work	Role	Type	Location
★ Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Applied Research Associates, Inc.	Supporting Organization	Industry	
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia
Terminal Velocity Aerospace, LLC	Supporting Organization	Industry	Atlanta, Georgia

## Primary U.S. Work Locations

California	Colorado
Maine	New York
Ohio	Virginia

## Project Transitions

▶ **October 2013:** Project Start

✓ **September 2017:** Closed out

**Closeout Summary:** With the completion of arcjet testing and the assembly of a pathfinder demonstration unit, CA-TPS achieved a TRL of 4. The CA-TPS project advanced manufacturing. Complex geometry, and size scale-up of a high strain capable vehicle heat shield system. Manufacturing methods were established that can be used to accommodate both single and double curvature sections of a heat shield and aerothermal heating tests demonstrated that the system can handle heating rates of 1000 W/cm<sup>2</sup> through ground based testing advancing the capability to TRL 5.

## Project Website:

<https://www.nasa.gov/directorates/spacetech/home/index.html>

TechPort

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For more information and an accessible alternative, please visit:  
<https://techport.nasa.gov/view/13636>

## Project Management

**Program Director:**

Mary J Werkheiser

**Program Manager:**

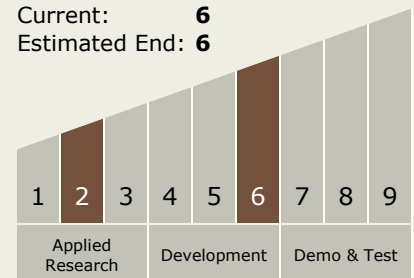
Gary F Meyering

**Principal Investigator:**

Ethiraj Venkatapathy

## Technology Maturity (TRL)

Start: 2  
Current: 6  
Estimated End: 6



## Target Destination

Others Inside the Solar System